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Geomechanical Insights for Operational Excellence – Does Strain Matter?

Anke Simone Wendt

SLB

Abstract:

Strain serves as the pulse of the subsurface, linking its past, present, and future to the forces exerted by drilling, production, and injection. As a fundamental response parameter, strain captures the mechanical behavior of rocks under stress, integrating material properties, stress conditions, deformation mechanisms, and resulting structural changes. Its application spans subsurface analysis, wellbore stability, hydraulic stimulation, production optimization, geothermal energy extraction, and CO_2 sequestration. By analyzing strain, geomechanical engineers can predict and mitigate risks, optimize drilling and production strategies, and ensure long-term subsurface integrity across asset lifespans.

This presentation begins by exploring the fundamentals of rock strain, highlighting how it reflects deformation processes through laboratory experiments and geomechanical modeling. These insights are critical for understanding compaction, dilation, and failure mechanisms, enabling better design and operational decision-making. The discussion then introduces Finite Element Modeling (FEM) as a powerful computational framework for simulating strain evolution, stress redistribution, and subsurface responses to various engineering activities.

Finally, real-world case studies illustrate the operational value of strain analysis. Applications include wellbore stability enhancement, mud loss prevention, fracture stimulation efficiency, reservoir compaction management, secure CO_2 sequestration and improved geothermal system design. These examples demonstrate how strain-driven insights support operational excellence and sustainable energy solutions in complex subsurface environments.

Biography:

Anke Simone Wendt is the Domain Head for Geomechanical Services and Geomechanics Advisor at SLB Digital. She joined SLB in 2005, working extensively in Northern Europe and Scandinavia in various geomechanics roles until moving to a global position. Anke earned her PhD in Geosciences in 1994 from the University of Mainz, Germany, and the Ecole Normale Supérieure, France. She has held research and teaching positions across France, Britain, and Germany, focusing on cross-disciplinary geomechanics. Anke holds four patents, has published extensively, and actively contributes to the SLB Foundation (Faculty for the Future) and the EAGE O&G Circle.

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Clean-up and Flowback – The Art of Well Start-up, Clean-up and Flowback. From Deep-Water to Unconventional

Bertrand Theuveny
SLB

Abstract:

The production life of any well is starting with a kick start operation that bring the hydrocarbons to surface. The start-up operation is also realized systematically after every work-over. We estimate that over 100,000 operations are carried out every year. Prior to these operations - save for underbalanced drilling, the well has been submitted to an over-balanced condition. The interaction between the drilling and completion fluids and the near well bore governs the efficiency of the operation. The goal of these operations is to displace most of the non-hydrocarbon / water and solids out of the wellbore and near wellbore. After stimulation, gel and remnants of acid must also be removed from the well.

The design of these operations is extremely empirical and relies on practical experience that has worked in the past. Is it possible to determine from the data extracted from these operations, some form of guidance to enhance the performance of these clean-up operations? With transient well bore models, what lessons can be derived to achieve better productivity? Are there any completion strategies that leads to better drainage?

The design of clean-up in deep water is further complicated by the issues of flow assurance, when low temperature can generate hydrates and wax precipitation that could hinder the flow and lead to plugging at the mud line. Further complexities arise from geomechanical limitations of the near well bore area.

During the execution, what controls are available in real time to ensure best performance while protecting the well / the fractures? And how fast does one need to react to these changes of operating conditions? It is possible to optimize this multi-dimensional, multi physics operation to achieve faster results with higher productivity. The result of the optimization is sometimes counter intuitive, demonstrated in some operations. Reduction of over 50% of emissions can be achieved, and yet deliver a clean well, through active choke optimization.

Biography:

Bertrand Theuveny has been involved in well testing since joining Schlumberger in 1985. He has worked in various field operation positions in Mexico, Brazil, Algeria and Libya. Bertrand transferred to Norway as support manager for 3-Phase Measurements, coordinating the deployment of Vx multiphase metering technology. In 2002, he oversaw the production and reservoir software portfolio and was product champion for the first web-based Production Real-time Infrastructure. Based in Moscow for 7 years as the scientific advisor and research director he coordinated the research activities on well start-up and clean-up. Now in Paris, Bertrand is the technical director for Well Testing and Production Monitoring worldwide. Bertrand has a degree in ocean engineering from Ecole Centrale Paris (1982), and MS degrees in geophysics and petroleum engineering from the University of Alaska, Fairbanks (1985).

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Log-Based Permeability: What Are We Measuring?

Chiara Cavalleri
SLB

Abstract:

The estimation of rock permeability is essential for modeling reservoir performance and production history in oil and gas fields, as well as supporting reservoir management and development across various sectors, including geothermal and underground storage projects. Despite decades of research, accurately determining true permeability remains a challenge. The results are often marked by significant uncertainty.

Effective permeability and flow potential in new wells are typically assessed using core and well testing. Advancements in logging technology and data analytics have expanded log evaluation techniques, enabling the development of innovative interpretation workflows, which allow for more representative calculations of permeability from logs.

This lecture first reviews and compares existing permeability prediction methods and log-based typing approaches, emphasizing their advantages, applicability, and limitations when applied to heterogeneous rock systems. Apparent discrepancies in computed permeability profiles derived from various log data sources and domains are examined collaboratively, serving as a learning tool to enhance the understanding of heterogeneous pore connectivity and the distribution of flow pathways.

Subsequently, integration of the latest advancements in hardware and evaluation techniques is introduced through a field example that provides a comprehensive multi-scale workflow to deliver understanding of the permeability field, connectivity, well deliverability, and recovery.

I would like the audience to take away the idea that permeability is a critical parameter throughout all stages of reservoir management; being pertinent to a broad spectrum of disciplines and energy sectors. While predicting rock permeability remains challenging, significant progress can be achieved by integrating measurements and expertise through a collaborative approach.

Biography: Chiara Cavalleri is a Petrophysics Advisor at SLB in Saudi Arabia, where she brings extensive expertise in wireline logging, formation evaluation, and well data interpretation. Her work is centered on leveraging advanced technologies, implementing multidisciplinary workflows, delivering integrated solutions, and coaching. With years of field logging experience, Chiara transitioned into petrophysics, holding key technical roles across West Africa, Europe, and Southeast Asia before establishing herself in the Middle East.

Chiara holds a master's degree in environmental engineering from the University of Pavia, Italy. She has contributed to the industry through numerous technical publications on reservoir characterization across diverse applications, including oil & gas, UGS, CCS, and geothermal energy. She is also a patent holder and actively shares her expertise through industry technical events and workshops.

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Pro-Active Reservoir & Production Engineering Surveillance

Chris Fair
Oilfield Data Services, Inc.

Pro-Active Reservoir & Production Engineering Surveillance is the practice of observing and analyzing historic and real-time pressure, rate & temperature data, understanding the performance of a well/reservoir (and how/why it may be changing), then managing the well to maximize the Net Present Value (NPV) and/or reserves recovery. A surveillance engineer should also actively look for ways to improve a well's performance.

In Well/Reservoir Management, there is a balance between maximizing short-term production rates and maximizing the long-term reserves recovery, with the overall goal being to maximize the net present value (NPV) of the asset. However, the parameters used to determine this balance are dynamic. Reservoirs and fractures can compact. Skin can accrete due to fines, scale, asphaltenes, fluid changes, or proppant movement. Drive mechanisms can change, faults can leak, frac hits can happen; water contacts can move. The job of the surveillance engineer revolves around the tracking of how and why these parameters change, combined with evolving strategies to maximize the asset's NPV.

The lecture will demonstrate what effective Surveillance Engineering can accomplish. It will also describe the automated tools available to surveillance engineers, discuss the workflows of the engineering team using the automation, and demonstrate ways to present surveillance results, conclusions and recommendations to engineering managers and other decision makers in a clear and concise manner.

Major Take-Away: Automated Reservoir & Production Engineering Surveillance gives engineers more time to think about what the results mean – it's much easier to check the results than to do the number crunching manually! Critically, this permits engineers to get ahead of problems before they cause permanent damage and/or become prohibitively expensive to fix.

Biography:

Chris Fair received his BS in Chemical Engineering (1994) and his MS in Petroleum Engineering (1997) from the University of Houston. Early in his career, he worked in both the chemical industry and the upstream oil/gas sector. These included roles in process operations, project/design engineering, PVT and fluid mechanics research, well instrumentation, MWD/LWD, technical writing, and process control. In 1997, Chris joined Data Retrieval Corporation (SPIDR). In 2005, he started Oilfield Data Services, Inc. (ODSI), a firm that specializes in Reservoir Management and Production Engineering Surveillance, a professional passion. One of his principal pastimes is singing with the Houston Symphony Chorus.

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Cool Learnings: how LNG fundamentals are advancing the new energy technologies of liquid H_2 & CO_2 transport

Professor Eric F. May

Chevron Chair in Gas Process Engineering, The University of Western Australia
CEO, Future Energy Exports CRC
Western Australian Scientist of the Year, 2021

Abstract:

This lecture reveals how technologies and lessons from the LNG industry are central to the development of future CO_2 and hydrogen supply chains. As advanced economies seek to decarbonise, clean hydrogen has been identified as a missing link that can help solve the major challenges of storing renewable power and enabling the cost-effective supply of low-carbon energy. However, this is not the first time hydrogen has been promoted as the key to transitioning our energy system and prudence about over-hyped claims and projections is warranted. While there are important differences between the present opportunities for hydrogen and those of the past, key challenges remain. Recently, the imperative of energy security has revealed that natural gas will play a sustained role in the global energy supply and trade for many decades to come. This means that a new international trade in the capture, transport, use and storage of CO_2 will become increasingly important if decarbonisation objectives are to be met.

A common feature of the three primary molecules, H_2, CH_4 and CO_2, central to future energy and decarbonisation supply chains is the need to store, transport and handle them as cryogenic liquids. The associated engineering challenges vary with each fluid, given their significantly different temperature and pressure ranges, likely impurities, and the technical maturity of the associated liquefaction and storage systems. However, there are many commonalities and opportunities for concepts proven by the well-established LNG industry to be tested for decarbonisation applications. Some of these “cool learnings” will be explored here, while knowledge gaps, innovative solutions and cutting-edge technology for new energy applications will also be presented.

Biography:
Eric May is Managing Director of the Future Energy Exports (FEnEx) CRC and was named the 2021 Western Australian Scientist of the Year. His research team works closely with industry, conducting projects in hydrogen liquefaction, LNG production and decarbonisation, gas separations, CCS and fluid property prediction. Eric was awarded the Malcolm McIntosh Prize for Physical Scientist of the Year as part of the 2012 Prime Minister’s Prizes for Science. In 2017, he co-established Gas Capture Technologies Pty Ltd, a spin-out company for patented technologies to capture methane from coal mines, land-fill gas and other sources.

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Direct CO_2 Capture from Air: A Perfect Partner for CCUS?

Helena Wu
Santos Ltd

Abstract: Include "What is the one idea you would like the members to take away from this lecture?"

As the global energy sector strives to meet ambitious climate goals, carbon capture, utilization, and storage (CCUS) remains a cornerstone of the pathway to net-zero emissions. One of the most exciting advancements in this field is Direct Air Capture (DAC), a technology capable of removing CO2 directly from the atmosphere. DAC projects are already operational across Europe, North and South America, the Middle East, Asia, Oceania and Africa. This lecture will explore the potential of DAC as a key partner to existing CCUS solutions, examining how its integration into current and planned systems can accelerate the transition to a lower carbon future.

Through an overview of major DAC technology types, this presentation will highlight the current state of development, its scalability, and the role of DAC in addressing the hard-to-abate emissions that traditional capture methods may miss. Technology and site selection case studies will illustrate key considerations in planning and deployment. Given the development and uptake of DAC technology relies on policy and market signals, the topic will be examined through both technical and commercial lenses.

A key takeaway is that integrating DAC with CCUS infrastructure can significantly enhance the global capacity for carbon removal. DAC is not a standalone solution, but a powerful partner in the broader effort to achieve net-zero emissions and create new business opportunities. The petroleum industry – leveraging its subsurface expertise, large-scale project execution capability, and worldwide infrastructure – is uniquely positioned to enable, deploy, and scale this technology as part of the evolving energy transition.

Biography:
Helena Wu is Business Development Manager at Santos, leading the company's Direct Air Capture initiatives since 2022. She is responsible for setting and executing the strategy, overseeing project origination, technology vendor and customer collaborations. Helena has engaged over 40 vendors globally, representing Santos in technical and management meetings. Helena's background is in reservoir and production engineering, planning and commercial, working across assets in Australia, Papua New Guinea and Timor Leste. Helena holds an honors degree in Mechanical Engineering, masters degree in Petroleum Engineering and an MBA. Helena is an active SPE volunteer, serving on the SPE International Board from 2016-2019.

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Overlooking Value? An Optimized Approach to Revitalize Mature Fields

Indira Saripally
Occidental Oil & Gas Co.

Abstract: Include "What is the one idea you would like the members to take away from this lecture?"

Although new discoveries and developments often take the limelight, mature fields, also known as brownfields, are considered the "backbone" of the conventional side of the oil & gas industry. These assets account for nearly two-thirds of the world's oil production. Hence, as they naturally decline, they require thoughtful and customized solutions to unlock their full potential. Revitalizing mature fields can yield attractive returns, because they have lower capital requirements and fewer uncertainties than new developments.

This presentation introduces a practical "gap analysis" framework for optimizing field development plans, illustrated with case studies from onshore and offshore fields in the US and Middle East.

The key takeaway: Understanding of how optimization, innovation, and precise timing of revitalizing activities can transform mature fields from declining assets into resilient, long-term generators of free cash flow. By using a few key techniques, these brownfields can be a reliable source of cash flow using existing infrastructure, rather than letting your mature fields tail off towards premature abandonment.

Biography:

Indira Saripally is Reservoir Management Team Lead at Occidental with 18+ years of experience in US and the Middle East in reservoir management, simulation modeling, and business development. Indira specializes in revitalizing mature oil fields and has led complex waterflood projects in deepwater fields. Her achievements include leading field development for multi-billion-dollar joint ventures, and championing capability development in diverse teams.

Indira holds a MS in petroleum engineering from Stanford and a BS from IIT. She serves on SPE's JPT Executive Review Board and leads Stanford's alumni outreach in Qatar. She has chaired international SPE sessions and authored papers on mature field recovery.

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New Frontier of Autonomous Inflow Control Technology

Dr Ismarullizam Mohd Ismail
InflowControl AS

Abstract:

The world needs reliable energy. As an industry, we supply that energy. Understanding the reservoir challenge and uncertainty, while implementing new technologies could lead to secure sustainability production.

Global oil and gas production has always been plagued with high water cut (WC) and high gas-oil ratio (GOR). Unwanted production negatively impacts performance and consumes unnecessary energy, resulting in low hydrocarbon recovery. The reservoir uncertainty presents several challenges and is essential in optimizing the completion design to improve the production performance of individual wells and reduce unwanted production to the surface. In today's engineer's toolbox, various new autonomous completion technologies are available to assist in achieving operational targets.

New Frontier Autonomous inflow control technology uses both density and viscosity principles, expanding its use from ultra-light oil to extra heavy oil. Moreover, the autonomous inflow control technology application has been extended for gas wells and injection wells for improved recovery and reduced unwanted production. These advancements also support the development of marginal and challenging fields with increased economic efficiency.

Integrating different disciplines to understand the production challenge by producing the hydrocarbon more efficiently and the industry can contribute to a more long-term sustainability production. Case study will be presented that demonstrate the enhanced hydrocarbon recovery and reduction in unwanted gas and water production and contribute toward sustainable production.

"What is the one idea you would like the members to take away from this lecture?"

Autonomous inflow control technology has been developed further across various applications ranging from heavy oil to ultra-light oil and furthermore extended to Gas well and Injection well to enhanced recovery and reduce unwanted Production.

Biography:

Dr. Mohd Ismail has a PhD in Mechanical Engineering from the University of Leeds, United Kingdom. He is the Chief Technology Officer at InflowControl in Aberdeen, UK. With over 20 years of global experience in advanced completions, petroleum engineering, and R&D, he has been involved in the development and deployment for more than 800 wells worldwide using inflow control technologies. He holds various patents for inflow control design and has multiple publications to his name.

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Casing Design for a New Era: Historical Insights and Future Challenges

John A. Howard
President
Altus Well Experts

Abstract

Understanding how casing design theory and practice have evolved over time is more than a historical exercise. It provides essential context for recognizing where traditional tubular stress analysis – even those developed for High-Pressure/High-Temperature (HPHT) wells – struggles to meet the demands of today's far more complex environments. Modern wells – including Extended-Reach Drilling (ERD), multistage-fractured unconventionals, subsea wells with sealed annuli and trapped annular risk, Carbon Capture and Storage (CCS) injecting CO_2 with impurities, and the new generation of super-hot geothermal wells – introduce load conditions that fall well outside the assumptions that shaped the previous casing design models.

This presentation follows the journey of the evolution of casing design from the early load-case framework of the 1960s to the far more demanding wells we design today, showing how assumptions and design logic have had to evolve along the way. Yet even with powerful computational tools now available, many tubular failures still trace back to the same root cause: incomplete or inaccurate load descriptions, optimistic, or based on oversimplified pressure and temperature assumptions. Although the industry has never had a single universal standard, a consistent design process tends to emerge once the load cases are defined with enough rigor and realism.

By connecting the foundational practices of casing design with the realities of modern wells, this session offers practical insights into engineering judgment, innovation, and model selection. It shows how core design principles continue to adapt to HPHT, ERD, CCS, geothermal, and other lifecycle load requirements.

Casing design remains a living discipline: its success relies on continually improving tools, more realistic load modeling, and engineers who are willing to challenge assumptions in an increasingly complex energy landscape.

Bio

John A. Howard is a board-certified petroleum engineer specializing in tubular design, well integrity, and applied engineering. As Co-Founder and President of Altus Well Experts, Inc., he has led the company to global recognition, supporting more than 80 major oil and gas operators. During his tenure at Enertech as Worldwide Sales Manager and Board Director, he helped develop WellCat™ into the industry benchmark for casing and tubing thermal analysis, significantly shaping modern well design practices.

John combines deep technical experience with a strong commitment to knowledge sharing. He speaks frequently at conferences and universities, bridging theory with field application. John has taught casing design courses in more than 30 countries across six continents. He has been an active member of the SPE for 45 years and has attended over 100 SPE Conferences, Forums, and Workshops around the world. John has served in numerous SPE leadership roles and currently serves as Technical Program Chair for SPE ATCE 2026 and sits on the ATCE 2026 Executive Committee.

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What Petroleum Engineers Should Know About Climate Science

John Schopp
Schopp Energy LLC

Abstract:

Petroleum Engineers should have a basic grasp of climate science. While alarmists in the media have caused many of us to tune-out, the science can be quite interesting. This 30-minute presentation reviews the basic physics, some learnings from paleo reconstruction, recent temperature trends, and then teaches how engineers can make their own future warming calculations. You may be surprised how similar are projections between the scientists on the Intergovernmental Panel on Climate Change and other well-known scientists branded as skeptics.

Often missing from the climate narrative is perspective on climate shift versus natural weather variability, for both temperature and storms. This presentation tries to frame this distinction for you so you can make up your own mind on urgency. The climate narrative will always be ubiquitous for the oil and gas business, so hopefully by having a grasp on the science we engineers can better influence the narrative, and quantitatively understand how our actions can be helpful.

Biography:

John Schopp, SPE, was Vice President at Encana for 15 years, and then Senior Advisor to private equity company Blackstone Group for 5 years before retiring in 2021. He is a lifetime weather enthusiast, and upon retirement found the time to read the 2400 page Intergovernmental Panel on Climate Change report as well as a number of books and technical articles on climate science. John penned the JPT article “Engineer Raises Climate Science Above the Din” in 2023 and recently taught an SPE Masterclass titled “Climate Science for Engineers”.

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From Human Error to System Resilience: Rethinking Safety and Human Performance in Complex O&G Operations

Josue E. Maia Franca
PETROBRAS

Abstract

The core takeaway of this lecture is that improving safety and performance in complex O&G operations requires a shift from focusing on controlling human error to understanding and enhancing system resilience. Traditional safety approaches often emphasize error prevention and compliance, assuming that accidents result only from individual failures. However, this view overlooks the complexity of contemporary work environments and the adaptive capacity of people who manage variability and unexpected situations every day.

In this sense, this lecture introduces a resilience engineering perspective, emphasizing how successful outcomes depend not only on procedures and equipment but also on human expertise, flexibility, and decision-making under pressure. Drawing on concrete examples from our industry operations and insights from research using the Functional Resonance Analysis Method (FRAM), we will demonstrate how work-as-imagined frequently differs from work-as-done, and how understanding this gap is key to building safer systems.

In the end, attendees will gain a practical understanding of how to analyze everyday operations and design systems driven by performance variability, recognizing human competence as a critical source of insight rather than a problem to be fixed. By moving beyond reactive, error-centric models, organizations can proactively develop resilience and better navigate complexity and unpredictability. Ultimately, participants will see that people are not a problem of the system, but a solution response of all its complexity, enabling safer and more productive operations across our industry.

Biography

Josué is a safety engineer at Petrobras and professor at universities in Brazil and Sweden, including UFRJ, PUC-RS, and KTH. With 20 years of experience in the offshore oil and gas industry, he specializes in human factors, process safety, and resilience engineering. He holds a DSc from UFF (Brazil) and a Postdoc from Linnaeus University (Sweden), publishing more than 50 scientific papers in Journals and Conferences. Chair of the SPE Human Factors Technical Section and recipient of the 2024 SPE HSE Award, Josué is dedicated to bridging theory and practice to advance safety and resilience in O&G industry.

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Everything is an Optimization Problem: The Next Frontier Using Data and Models

Justo Matheus
SLB

Abstract

In the era of digital transformation, the petroleum industry faces a critical challenge: how to extract actionable insights from vast amounts of data while optimizing operational decisions. Nearly every aspect of our industry is, at its core, an optimization problem. Even recent breakthroughs in Artificial Intelligence are largely driven by advances in optimization algorithms.

One key challenge is balancing high-fidelity physics-based models with real-time data assimilation. Traditional full-scale simulations are computationally expensive and impractical for fast decision-making. Reduced Order Models (ROMs) provide a solution by creating simplified representations that maintain accuracy while significantly reducing computational costs.

We will explain how optimization algorithms in combination with data-driven reduced order model can be used for decision-making, and how optimization could revolutionize complicated well intervention workover scheduling using a portfolio management approach.

Biography:

Justo Matheus, a Principal Engineer at SLB, has over 25 years of experience in optimization, control systems, and machine learning for petroleum engineering. With a Magister in Control Systems, he began his career in 1997 as an Automation Engineer and later transitioned to become Principal Data Scientist.

He joined SLB in 2006 as a Senior Control Systems Engineer, he has been instrumental in the development of Rotary Steerable Systems (RSS). For more than 15 years, he specialized in Reduced Order Models (ROMs), Process Control, and Optimization; turning complex physical phenomena into clear, data-driven models.

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Modern Open Hole Wireline Operations: Safer, More Efficient Outcomes with Proactive, Holistic Planning

Lee Hyson
Gaia Earth Group

Abstract:

Open hole wireline logging continues to be the preferred, cost-effective method of formation evaluation in our industry. But as wellbore geometry, trajectory, and logging objectives become more complex, the longer and heavier logging tool strings introduce greater deployment risks, operational uncertainty, and costs.

Traditional wireline logging job planning based on tension simulations is no longer sufficient because other hazards can be left undetected with potentially costly consequences.

This lecture presents a modern-holistic methodology, already widely adopted, that integrates wellbore geometry, trajectory, formation properties, operational requirements, and insights from databases of historical wireline jobs that include well designs and operational outcomes.

Attendees will gain understanding of a data-driven framework for evaluating deployment risks, including quantifying differential and mechanical sticking, along with practical guidance for safer and more reliable wireline operations.

Biography:

Lee holds a bachelor's degree in Mechanical Engineering from Case Western Reserve University and has completed the Stanford Graduate School of Business LEAD program. He began his career as a wireline engineer and has spent more than two decades supporting operations globally, including the Rocky Mountains, Southeast Asia, the Marcellus, the Gulf of America, Mexico, the Caribbean and the North Sea.

Since joining Gaia in 2011, his work has focused on strengthening wireline job design and execution by developing practical frameworks, modeling approaches, and field methods for challenging wells. He has provided wellsite QA/QC support on more than 175 field operations and has contributed to the creation and refinement of several of the planning and risk-assessment workflows highlighted in this talk. Lee has authored technical papers and frequently delivers in-house training on applying systematic, model-based strategies to improve wireline performance.

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Global Low Permeability Field Development: To Go Horizontal or Not?

C. Mark Pearson
Liberty Resources LLC

Abstract:

The development of low permeability oil and gas fields in North America (NAM) accelerated in the 1970's and 1980's with the application of hydraulic fracturing to vertical well field development. This resulted in a large increase in drilling activity – reaching a peak of over 4000 rigs operating in the USA in the early 1980's; drilling vertical wells in tightly spaced development patterns as low as 5 to 10-acre spacing.

In the mid-1980's, the NAM oil and gas industry started testing unconventional reservoir development in tight gas and coal-bed methane formations. This ultimately paved the way for the first horizontal well multi-fractured well completion designs in the 2000's - first to shale gas formations and then shale oil formations. The impact of this is that the USA became the world's largest producer of both oil and natural gas – the majority of which today comes from field developments employing multi-stage fractured horizontal wells.

As the Rest of World (RoW) begins to ramp-up development of its "low perm" and "tight" resources an appropriate question to ask is "when does it make economic sense to switch development plans from vertical to a horizontal well, multi-stage fractured design?"

This presentation reviews the industry's early horizontal well developments; shows example reservoir simulation results comparing horizontal and vertical well productivity across a variety of different permeability datasets, and ultimately through comparing development economics make the case that the Global future of our industry is horizontal.

"What is the one idea you would like the members to take away from this lecture? "
Learnings from the horizontal well development of unconventional North American reservoirs have great application to future low permeability development of global oil and gas resources.

Biography:

Dr. Mark Pearson is President & CEO of Liberty Resources LLC, a Denver-based operator in the Bakken Shale of North Dakota for the past 15-years. He has over 35 years of horizontal well field development experience, and has authored over fifty technical papers & six patents covering field development, "fracking", and oil and gas operations. He graduated with BS and PhD degrees from the Camborne School of Mines, UK and is a graduate of the Harvard Business School Advanced Management Program. He is an SPE Distinguished Member who in 2018 received the SPE International Completion Optimization & Technology Award.

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Well Interventions: Untapped Potential and the Path Past Industry Barriers

Matthew Billingham
SLB

Abstract: Well interventions offer a significant opportunity to enhance production at low cost, extend field life, and improve recovery, it will be presented that they remain underutilized across much of the oil and gas industry. This lecture explores the reasons behind this gap, focusing on the technical and organizational barriers that prevent operators from fully leveraging intervention opportunities.

Despite the availability of mature technologies and workflows, interventions are often deprioritized due to logistical issues, complex and fragmented planning, misaligned incentives, unpredictable outcomes and a lack of integrated collaboration between stakeholders. The result can result in persistent inertia, where technically viable interventions are missed, delayed or rejected, even when they could deliver material value.

This lecture will examine the root causes of this inertia, including how current workflows, technology and decision-making structures contribute to missed opportunities. It will also highlight how new collaborative approaches, built around aligned outcomes and shared accountability, can help overcome these barriers. By integrating technical planning with operational execution and commercial strategy, organizations can unlock the full potential of well interventions.

Drawing on real-world examples, in collaboration with the UK regulator, and industry data, the lecture will provide a framework for identifying intervention opportunities, assessing feasibility, and implementing workflows that reduce uncertainty and improve execution. Attendees will gain practical insight into how technical teams can drive change within their organizations and contribute to more proactive, value-driven intervention strategies.

Biography:
Matthew Billingham is Technical Director for mechanical intervention at SLB Reservoir Performance, based in Paris, with over 30 years of experience. He provides global technical guidance across service delivery, technology development, and intervention techniques, and leads the SLB Reservoir Performance Intervention Domain community. He has held senior roles in wireline, slickline, coiled tubing, and testing services globally. Matthew holds a BEng from Leicester University and an MSc with Distinction from Heriot Watt. He has authored multiple papers, holds multiple intervention related patents, and serves in leadership roles within ICoTA and the SPE/ICoTA Well Intervention Conference.

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Operational Excellence:
How to Increase Profits at Any Oil Price
A higher level, deep dive into sucker rod pumping fundamentals

Mike Poythress
ConocoPhillips

Abstract: Include "What is the one idea you would like the members to take away from this lecture? "
When many horizontal wells are converted from ESP or Gas Lift to Sucker Rod Pump (SRP), there is an expected and unfavorable step change in production, along with a predictable season of repeat downhole failures.
Most SRP wells struggle to produce the rates calculated with the current design programs. As pump intake pressure decreases, gas interference becomes a greater issue in the pump. This situation decreases daily run times as the controller identifies these low fillage events and puts the well into a temporary Idle Time, completing a run/stop cycle. Many Operators increase Idle Times to reduce the number of cycles each day, expecting a higher number of cycles will lead to more failures. This results in wells with high fluid levels on the backside, running less than 24 hours per day.
This situation also happens with vertical wells when the fear of failure, and perceived lack of time to optimize a well, becomes the standard. When horizontal wells slug, gas interference becomes an even larger issue. Wells can experience hours of what appears to be no fluid at the pump, which limits run times and production.
The author believes it is imperative that Operators and Suppliers partner together to develop technology that will accurately identify failure risks when operating under the volatile slugging conditions that horizontal wells present in a rod pump application. All while identifying optimum operating practices during the ever-changing conditions to maximize production in both horizontal and vertical wells.

Biography:
Mike Poythress is a Principal Production Engineer at ConocoPhillips, where he provides technical support to the Global Engineering and Operations teams in the sucker rod pumping arena. Design, optimization, troubleshooting, failure analysis and training – with a focus on the sucker rods, pump and SCADA system. In 11 years at ConocoPhillips, Mike has received 6 awards in the annual Top Instructor program. Mike is the recipient of the SWPSC's 2025 J.C. Slonneger award, and he was the 2024 Permian Basin AL Conference Chairman. Prior to joining ConocoPhillips, Mike worked 35 years for four companies that make pumps and sucker rods.

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Gas Lift Tricks You Can Use: Innovation Adventures in Gas Lifting

Michael Romer
ExxonMobil Technology and Engineering

Abstract:
Gas Lift (GL) has been in use for over a century, but it can still be improved through innovation and field testing. This presentation will review more than a decade of GL technology projects and resulting learnings. Topics include equipment reliability, surveillance, optimization, troubleshooting, and production improvement.

GL may not be resilient enough in certain applications. Hydraulically fractured wells have created solids-related reliability challenges. More than 20 check valve models were subjected to an erosive flow loop. Weaknesses were identified, and a survivor emerged in the process.

Data is key to GL surveillance, but not all assets possess the required quality. Wireless sensors were deployed at legacy offshore assets to enrich data acquisition and optimize by proxy. Ultrasonic gas flow meters were vetted in the lab and field to ensure they could meet injection gas metering needs at locations where testing is rare.

Sometimes the data indicates a GL well is not achieving its potential. CO_2 tracing is a proven method of identifying where GL gas is being injected without affecting production. A radioactive tracing pilot was undertaken to validate an even simpler concept. Even if the GL is on target, lift hydraulics could be enhanced if slip among produced fluids could be reduced. Surfactants were piloted in various GL configurations to determine their effectiveness.

As these complementary topics demonstrate, GL optimization requires an integrated, multidisciplinary approach. This presentation aims to show that technology advances can be driven by asking and acting on the question, “Why can’t this be better?”

Biography:
Michael C. Romer, P.E. is Principal Artificial Lift (AL) Engineer at ExxonMobil and is on the Upstream Production Optimization team in Houston. He has been with ExxonMobil for more than 19 years, primarily focusing on global AL. Michael developed ExxonMobil courses on gas lift, ESPs, rod pumps, and deliquification and enjoys delivering them worldwide.

Michael is the API 19G (Gas Lift) Task Group Chair, ALRDC Board Secretary, SPE Americas AL Conference Vice Chair, and an SPE ESP Symposium committee member. He holds BS and MS degrees in electrical engineering from the University of Tennessee and the University of Illinois, respectively.

Society of Petroleum Engineers
Distinguished Lecturer Program

Developing Polycrystalline Diamond Cutters (PDC) for Hard Rock and Geothermal Drilling

Neil Haddock
US Synthetic

Abstract:

The invention of diamond synthesis in the 1950s led to polycrystalline diamond cutters (PDC) that revolutionized oil and gas drilling. Early PDCs worked only for short intervals in soft formations, but technological advances extended their reach in harder rock, boosting U.S. shale drilling efficiency almost threefold over the last two decades. Effective problem-solving at the dull bit level with good drilling context improved PDC reliability, and these advancements now benefit geothermal energy projects where PDCs remain highly cost-effective. This talk will highlight strategies for increasing PDC performance in hard rock, including granite, through identifying and addressing root-cause failure modes in a collaborative process.

Biography:

Neil has been part of the effort at US Synthetic to improve the strength, toughness and thermal stability of polycrystalline diamond cutters (PDC) for the oil and gas industry for over 20 years. He has worked closely with PDC bit manufacturers throughout the world, testing and developing PDC's for drilling in challenging formations. He has extensive experience in cutter forensics and currently works with a team of scientists and engineers to develop products that help the industry drill more efficiently in hard rock, including geothermal formations. Neil received a Master of Science degree in mechanical engineering from Brigham Young University and is fluent in Mandarin Chinese.

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History Matching Reservoir Charge; Forecasting Complex Fluid Distributions and Tar Mats with Reservoir Simulation

Oliver C. Mullins
Mullins Reservoir Solutions

Abstract:

The advent of asphaltene thermodynamics allows determination of the extent of compositional equilibrium of reservoir fluids. Evaluation of 80 reservoirs enabled delineation of numerous processes reservoir fluids undergo over geologic time, giving rise to "reservoir fluid geodynamics" (RFG) and the eponymous 2019 book*. More recently, standard reservoir simulation has been used to model reservoir fluid entry and dynamics over geologic time to forecast current, measured reservoir realizations. This workflow tests the understanding of the charge sequence, fluid mechanics and reservoir structure via simulated reservoir fluid dynamics. These simulations require incorporation of the asphaltene nanocolloidal structures codified in the Yen-Mullins model. Simulations of reservoirs with a single, low maturity charge show the mechanistic processes of formation of graded viscous oils and tar mats as measured in a large field. The simulations clarify why tar mats form at the current, not paleo, oil-water contacts. Moreover, the simulations show why tar mats form preferentially in high permeability sections of reservoirs. Complex charge histories of reservoirs are also simulated and address reservoir connectivity. Reservoirs with oil and biogenic gas charges are simulated showing excellent, in-reservoir gas and oil mixing dynamics matching measured data from a Pliocene reservoir. Simulations of another reservoir match the measured huge solution gas gradient and gas-induced asphaltene migration. History matching reservoir charge provides a new, powerful way to test and improve reservoir understanding at any stage of exploitation, even prior to production.

* Free Pdf of book "Reservoir Fluid Geodynamics and Reservoir Evaluation" and also short video: https://www.slb.com/resource-library/book/reservoir-fluid-geodynamics-and-reservoir-evaluation

Biography:

Dr. Oliver C. Mullins is an independent contractor, former SLB Fellow and in the U.S. National Academy of Engineering. He initiated the discipline "reservoir fluid geodynamics", accounting for fluid compositional dynamics from charge to present. RFG is based on asphaltene thermodynamics which his team developed. He wrote 2 books, coedited 3 books, coauthored 330 publications, and coinvented 147 allowed US patents. He has received numerous awards including the SPE Anthony F. Lucas Gold Medal and the SPE International Reservoir Description and Dynamics Award, and the George A. Olah Award for Hydrocarbon or Petroleum Chemistry from the American Chemical Society.

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Investigating the potential of Geologic Hydrogen source rocks and reservoirs in continental settings

Olivier Sissmann
IFP energies nouvelles

Abstract: Include "What is the one idea you would like the members to take away from this lecture? "

It is now well established that geologic H_2 is emitted from a variety of geological settings, through different generation processes including radiolysis, organic matter cracking and iron oxidation. As exploration for this new resource is starting on every continent, focus is placed on mafic and ultramafic intrusions for their high iron (II) content and potential to generate H_2 through a process called serpentinization. This reaction occurs at plate margins on ophiolites, and within intracratonic areas in Precambrian rocks. It has already been well documented on the North American Mid-Continental Rift, where over 20 exploration wells have been drilled over the past 3 years. H_2 emissions have also been reported all around the globe, from Russia to Australia. Very much like at the beginning of the 20th century when we knew very little about petroleum systems, we still lack a lot of information about the kinetics of H_2 formation or consumption in the subsurface, how it accumulates, or even if large economical reservoir exists. Nevertheless, in West Africa, Mali, a complete H_2 system has been characterized from a pilot production site, with stacked shallow reservoirs, separated by doleritic sills.

The one idea I would like the members to take away from this lecture is that Geologic hydrogen is present on every continent in the subsurface. Despite all the uncertainties around native H_2 systems, exploration projects are starting on every continent, bringing new data and discoveries. Those will allow us to model H_2 systems and target accumulations more accurately, and potentially lead to an industrial production of this new resource.

Biography:
I am a French geologist who specializes in fluid-rock interactions. After graduating with a BSc from the University of Queensland, Australia, in 2007, I travelled back to France and obtained an MSc and a PhD on CO_2 mineral storage in 2013 from IPGP and ENS. I then joined IFP energies nouvelles as a Research Scientist, where I took on various roles as geochemical modeler, lab and project manager. I remain an associate lecturer at IPGP, where I teach courses on the Geology of Critical Metals and Hydrocarbons. For the past 10 years, I have been working on native H_2 emissions, collecting associated rock and gas samples around the globe whenever the opportunity arose, and mentoring PhD students on the subject. Today, I am co-leader of the IEA TCP Task 49 on Native Hydrogen, and work with colleagues from many countries to bring new data and recommendations to the energy industry.

Society of Petroleum Engineers
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Let There Be Light!

Creating Value from Distributed Fiber Optic Sensing

Richard Tøndel
Equinor ASA

Abstract:

Distributed fiber optic sensing transforms a standard fiber optic cable into a sensor that provides an array of real-time temperature or acoustic measurements along the entire length of the fiber. When interrogators are connected to fibers in wells, along flexible risers, pipelines, power cables and more, these continuous and rich datasets will improve operational insight. Such measurements are commonly referred to as DTS (distributed temperature sensing) and DAS (distributed acoustic sensing). This presentation will illustrate how the technology works, demonstrate it using animations and sounds, and discuss the benefits of real-time data logistics and visualization. The introduction will be followed by five recent data examples that illustrate the technology's diversity, and show how DTS & DAS monitoring can create value for our industry:

1) Monitoring of dynamic flexible risers
2) In-well production monitoring
3) Gas lift valve monitoring
4) Annuli liquid level tracking
5) Support during well interventions

Real data examples will be presented as images and sound clips. For these five examples, value is created through improved safety, increased production, enhanced regularity, and reduced need for inspections and repairs. A holistic cost overview will be discussed, and key challenges will be addressed. The five examples show only a small part of the value potential that can be achieved through DTS & DAS monitoring. This presentation will motivate the audience to reflect on how this technology can contribute, and hopefully inspire new use cases for how operations can be made safer, more prolific, and more cost efficient through the use of real-time DTS & DAS monitoring.

Biography:

Richard Tøndel received his M.Sc. in Petroleum Geoscience from Norwegian University of Science and Technology (NTNU) and holds more than 25 years of industry experience. He has managed several research activities involving time-lapse seismic, permanent sensor systems, and in-well measurements. During the last 15 years, the fiber optic element of his work has become more pronounced, and he is now responsible for Equinor's R&D fiber optic activities within subsurface. Tøndel was member of EAGE's Distinguished Lecturer Program in 2007 and has received internal and external awards for his presentations. He has co-chaired annual European SPE fiber optic workshops in the period 2022 – 2026.

Society of Petroleum Engineers
Distinguished Lecturer Program

Navigating Uncertainty for Value with examples from petrophysics

Russell Farmer
ADNOC

Abstract:
Throughout a field's life cycle, different factors will contribute to reservoir uncertainty. As reservoirs mature, petrophysical properties often become a major source of uncertainty, especially as marginal rocks and complex fluid variations become increasingly important. Despite its importance, petrophysical uncertainty has received relatively little focus in the literature, yet it should be a core part of subsurface workflows. This lecture will present examples which highlight where petrophysical uncertainty has proven to be critical.

By understanding uncertainty and analysing sensitivity, projects and businesses can improve outcomes. Risks tied to uncertainties can be managed more effectively, increasing the likelihood of achieving the expected business value.

By identifying key uncertainties and sensitivities early in the process, teams can allocate resources more effectively and focus on areas that offer the largest potential impact. This early integration helps avoid last-minute changes, minimizes delays, and ensures that projects remain aligned with both technical and financial objectives.

Integrating uncertainty into decision-making is effective at countering bias, strengthens project success and reduces unexpected challenges, allowing for resilient, well-informed decisions.

The one idea that members should take away from this lecture is that uncertainty should be addressed prior to detailed studies and be continuously and fully integrated into subsurface workflows using data driven approaches. This will support the prioritisation of work, highlight future data requirements and ensure the impact of uncertainty is assessed at core, well, and model levels, minimising the impact of bias, leading to improved project performance and project outcomes.

Biography:
Russell Farmer has more than 30 years of oil and gas industry experience including twelve years with Shell, six years as a consultant and twelve years with bp. In bp, Russell led teams in Iraq, Angola, Global Assurance, Middle East Oil and as Discipline Leader for Global Subsurface Solutions, Modelling and Rock Properties. Russell joined ADNOC in 2022 as Principal Petrophysicist and leads the discipline, focused on people development, technical standards, best practices and quality assurance of complex reservoirs. He is passionate about sharing knowledge and has spent fifteen years developing and facilitating training classes for formation evaluation professionals worldwide.

Society of Petroleum Engineers
Distinguished Lecturer Program

The Subsurface Secret to Optimised Well Abandonment

Ruth Thomas
Well-Safe Solutions

Abstract:

The fundamental principles of zone permeability, fluid content, formation pressure (including reservoir recharge prediction), and caprock integrity underpin subsurface isolation requirements and drive decisions regarding abandonment barrier placement. A comprehensive understanding of these elements is essential, as they not only shape the overall well abandonment design but also ensure that well duty holders remain compliant with regulatory requirements for long-term containment integrity.

As a subsurface community, we are highly skilled in quantifying the subsurface for exploration, appraisal, and development drilling, with a strong emphasis on reservoir-level characterisation. However, well abandonment presents a unique set of technical and operational challenges that require a shift in both mindset and approach. How do we define key isolation parameters when data is limited, particularly in the overburden? With aging well infrastructure, what happens when a seemingly “perfect-on-paper” abandonment plan proves unworkable in practice? What are the cost implications and where do the most significant optimisation opportunities lie?

Through a series of case studies demonstrating collaboration between subsurface specialists, well engineers, and Operators, this presentation will showcase industry best practice for developing a robust subsurface basis of design for abandonment. By addressing specific subsurface and engineering challenges encountered in well abandonment projects, it will provide insights into effective decision-making and risk-mitigation strategies and illustrate the benefits of engaging a subsurface team throughout the entire well abandonment process, from project conception through to execution.

What is the one idea you would like the members to take away from this lecture?
By embracing a data-driven, risk-based approach to well abandonment, we can shift the industry’s mindset from reactive problem-solving to proactive planning - ensuring that subsurface expertise plays a central role in shaping the future of well decommissioning.

Biography:

Ruth Thomas is a geoscientist with 24 years' experience in delivering subsurface projects for operators such as CNR International, Apache, Talisman Energy, and Repsol Sinopec. She holds a first-class Bachelor of Engineering honours degree in Industrial Geology; an MSc in Geology, and after earning her MSc in Decommissioning from the University of Aberdeen in 2022, she joined Well-Safe Solutions as their Subsurface Manager, responsible for the company's global subsurface portfolio.

Ruth is a strong advocate for the role of geoscience in cost-effective well abandonment, and she actively promotes technical excellence and industry best practice through regular regulator and industry engagement, conference presentations, and training initiatives. She is an active board member of the SPE P&A Technical Section, and co-founder and current chair of the Offshore Energies (UK) Geoscience Excellence in Decommissioning workgroup.

Society of Petroleum Engineers
Distinguished Lecturer Program

Building an Industry 4.0 Agentic AI for Autonomous Directional Drilling

Samba BA
SLB

Abstract: Include "What is the one idea you would like the members to take away from this lecture? "
Well construction is currently being challenged to become more sustainable while reducing the skill sets needed to have efficient and consistent directional drilling operations. Challenges related to directional drilling include encountering constantly changing formations, steering responses, planned trajectories difficult to follow perfectly, drilling data having huge uncertainties, especially the continuous measurements being affected by shock and vibrations, navigating efficiently into the reservoir for enhanced production capabilities, ever changing conditions between one well to another. These challenges often require significant human skillsets to become an efficient directional driller; and skillful directional drillers, who make the best directional decisions, are difficult to deliver for service companies and operators and becoming even more difficult as time goes.

The proposed topic is to highlight the technical challenges involved in providing an AI system to perform autonomous directional drilling. The AI system includes a continuous feedback loop between surface and downhole controllers to always make optimized decision. In addition to complex sensor fusion for the best state estimation, an optimization engine outputs the best candidate trajectory at each decision point. Several enhancements were necessary to move from advisory to control. The system has been made much more resilient to unexpected measurement-while-drilling (MWD) telemetry or downlink issues. The system's surface deviation controller actively monitors continuous data and takes the appropriate course of actions to rectify unplanned situations without overreacting.

Biography:
Samba has over 20 years' experience in drilling and drilling related technologies. He received a first Masters degree from the renown Ecole Polytechnique in France in 2001 with a major in Applied mathematics. He also holds a diplome des Grandes Ecoles from the Ecole National des Ponts et Chaussees and a DEA from the University Pierre et Marie Curie in Paris VI. He has worked in a bank as a mathematician for one year and then joined Schlumberger in 2004. He has worked in the field for the Drilling and Measurement segment as Measurement While Drilling (MWD), Logging While Drilling (LWD) and then Directional Driller (DD) up to 2006, before joining Schlumberger Cambridge Research (SCR) in Cambridge, United Kingdom as a research scientist, where he spent around 6.5 years on drilling related research. He then worked as a project Manager at the newly created (in 2012) Schlumberger Motor Center of Excellence in Katy, USA from 2012 to 2019. From 2019 to 2023, he was a domain solution architect, developing AI solutions for autonomous drilling while being based at Beijing Geoscience Center in China. Since 2023, he returned to Houston working on AI autonomous solution to help reach the highest level of drilling autonomy. His main interests are in applied engineering, drilling technologies and innovative digital solutions. In 2025, he was selected to become a board director for the Schlumberger Foundation supporting women pursue STEM education for developing countries.

Society of Petroleum Engineers
Distinguished Lecturer Program

From land to sea: Successful completions technology transfer from onshore to offshore wells (past, present, and future?)

Sanjay Vitthal
Retired from Shell in March 2025

Abstract:
Offshore and deepwater field developments have historically in higher permeability (100+ md) reservoirs. So, what interest should offshore completion engineers have in completion practices in wells in onshore shale reservoirs that are in 1/1000th to 1/millionth the permeability? More than we think! This presentation will start with the past and illustrate via case histories of how innovations/practices initially developed for onshore wells have helped unlock and improve the economics of offshore wells. This talk will also show examples of how practices originally deployed in darcy shales are continuing to improve today's offshore completions. Finally, we will explore how shale-based technology can help unlock some of the future economic challenges associated with brownfields and also some of the recent deepwater discoveries in lower permeability reservoirs.
The talk will also illustrate, with an example, the risks of blindly copying onshore completion technology without considering the unique challenges of offshore wells. Guidelines on how to transfer completion technologies from shales to offshore are provided

"What is the one idea you would like the members to take away from this lecture?
We should pay attention to developments in reservoirs (such as shales) that may appear to be completely different to offshore reservoirs but offer opportunities to improve economics. Keep an open mind and stay connected via SPE and other avenues to ideas and practices.

Biography:
Dr Sanjay Vitthal recently retired from Shell as the Principal Technical Expert for Hydraulic Fracturing Design and Analysis. He has 33 years of industry experience in Hydraulic Fracturing, Sand Control and Stimulation. His interests are in hydraulic fracturing, sand control, fluids, diagnostics, formation damage, and well performance. He has written 35 papers on the above topics and holds 10 patents. He been active in the SPE as a technical editor, contributing editor on 2 monographs, and as member of conferences, workshop, and forum committees. He is currently the Vice Chairman of the SPE Offshore Completions Technical Section.

Society of Petroleum Engineers
Distinguished Lecturer Program

Beyond the Hype: Transforming Subsurface & Production with AI Innovations

Shripad Biniwale
SLB

Abstract:

Artificial Intelligence (AI) is no longer a buzzword—it is driving real transformation in subsurface and production operations. From history matching and waterflood management to fast-track field development planning, AI-enabled workflows are accelerating complex engineering tasks, uncovering deeper insights from existing data, and improving the speed and quality of decisions. Yet, despite this promise, adoption remains challenging due to data quality issues, model trust, integration with physics, and cultural resistance.

This lecture presents real-world case studies where AI and hybrid AI–physics approaches have delivered tangible value. Examples include ML-assisted history matching in complex reservoirs, hybrid waterflood optimization using data-driven models enriched with physics, and accelerated FDP studies supported by uncertainty workflows and high-performance cloud simulation. These demonstrate how combining AI with domain expertise and scalable engineering frameworks moves solutions beyond pilots into production environments.

The session also explores how Generative AI and agent-based systems will extend today's fast-track workflows into autonomous, adaptive field management. GenAI can generate insights and recommendations, while agents can integrate those insights with domain tools, creating continuous, closed-loop optimization. They represent a natural evolution from today's fast-track workflows toward more adaptive, semi-autonomous field management.

By connecting technology, fostering agile innovation, and enabling people through training, transparency, and collaboration, the industry can overcome barriers and move from pilots to enterprise-scale transformation.

The central message is: **AI is not here to replace engineers—it is here to augment expertise, accelerate decision-making, and enable smarter, more resilient operations.**

Biography:

Shripad Biniwale is the Global Innovation Manager at SLB and a Principal Petroleum Engineer with over 20 years of experience spanning reservoir engineering, production optimization, field development planning, and data science. He holds a Bachelor's in Petroleum Engineering, a Master's in Reservoir Engineering, and an Executive MBA. Shripad leads SLB's AI and digital innovation efforts for subsurface workflows, driving the development and deployment of hybrid AI–physics models, intelligent agents, and fast-track field decision systems. He has authored 37 technical papers and is a two-time recipient of the SLB CEO Award. An SPE Regional Service Awardee, two-time Student Paper Contest winner, he actively contributes as a speaker, panelist, and mentor, advancing AI-enabled transformation in the energy industry.

Society of Petroleum Engineers
Distinguished Lecturer Program

Accelerated learning in the unconventionals through integrated field experiments with instrumented monitor wells

Tim Benish
ExxonMobil

Abstract: Include "What is the one idea you would like the members to take away from this lecture?

This presentation will provide an overview of unconventional field experiments conducted in recent years to measure fracture dimensions, that when combined with production analysis, can support and inform development decisions to avoid overcapitalization from suboptimal spacing, stacking, or stimulation choices. Specifically, it will highlight the benefits of dedicated monitor wells equipped with fiber optics and pressure gauge arrays to interrogate the three-dimensional fracture network. Pressure measurements integrated with fiber optic measurements provide a holistic interpretation of the extent and heterogeneity of the stimulated rock volume.

Vertical monitor wells are effective in determining the overall height of the created fractures as well as the drainage boundaries of individual benches. Slant monitor wells extend these measurements of fracture density and depletion at varying distances from a stimulated well to enable mapping of the fracture drainage network. Systematic variation of the completion design along the treatment well adjacent to a slant monitor well can be implemented to directly compare the efficacy of treatment design options in the same well.

Typically, well spacing and completion design are decided iteratively using well-level production, which is time intensive and often leads to inconclusive results. **While challenging to execute, diagnostic monitor wells provide definitive measurements of fracture dimensions, including their extent, variability, and associated depleted rock volume. This understanding delivers the clear direction needed for well placement and completion design decisions early in the asset development cycle so as to create the greatest value.**

Biography:
Tim has a Bachelor degree from Georgia Tech and a PhD from MIT in Chemical Engineering. Starting at ExxonMobil in 1999, he's had assignments spanning U.S. unconventional completions, Russian shale exploration, Norwegian subsea completions, and research on deepwater and unconventionals technologies with a recent focus on fracture diagnostics. He is currently the Hydraulic Fracturing Principal for ExxonMobil.